DEL. 302 834-4536
NJ. 201 997-1700
TWX 510-666-1629
STD CLOR DEC1

STANDARD CHLORINE OF DELAWARE, INC.

GOVERNOR LEA ROAD • P.O BOX 319 • DELAWARE CITY, DELAWARE 19706

100391

January 20, 1989

Ms. Diane Wehner
Environmental Scientist
DNREC
715 Grantham Lane
New Castle, Delaware 19720

Dear Ms. Wehner:

In accordance with Paragraph 6 of the Consent Order between Standard Chlorine of Delaware, Inc. and the Delaware Department of Natural Resources and Environmental Control, we are hereby submitting the Fourth Quarterly Groundwater Monitoring Report.

Please feel free to contact me if you have any questions.

Sincerely,

Robert J. Touhey, P.E.
Assistant Vice President
Environmental Affairs

RJT/dab

Enclosures

cc: A. R. Sinibaldi
T. E. Pierson
B. V. Bowers

QUARTERLY MONITORING REPORT
GROUND WATER RECOVERY OPERATIONS

STANDARD CHLORINE OF DELAWARE, INC.
DELAWARE CITY, DELAWARE

Thomas A. Drew, P.G.
Project Manager

Abraham Thomas, P.G.
Project Director

20 January 1989

PREPARED BY

ROY F. WESTON, INC.
WESTON WAY
WEST CHESTER, PENNSYLVANIA 19380

WESTON

QUARTERLY MONITORING REPORT
GROUND WATER RECOVERY OPERATIONS

STANDARD CHLORINE OF DELAWARE, INC.
DELAWARE CITY, DELAWARE

In response to the 22 January 1988 Consent Order between the Delaware Department of Natural Resources and Environmental Control (DNREC) and Standard Chlorine of Delaware, Inc., this quarterly report has been prepared to document monthly withdrawal rates and contaminant recovery at the pumping wells; and quarterly sampling results and water level data for the recovery and monitor wells. The report also contains an evaluation of the effectiveness of the recovery system and recommendations to improve the system. Documentation presented in this report covers the quarterly period from October to December 1988.

EVALUATION OF THE RECOVERY SYSTEM

The average monthly withdrawal rates from recovery wells RW-1 through RW-4 are presented in Table 1. Recovery wells RW-1 and RW-4 pumped continuously for most of the quarter except for a 7 day period in November when the plant was shut-down. Withdrawal rates at RW-1 and RW-4 ranged between 4.5 and 6 gpm which is consistent with historical pump rates.

A well rehabilitation program was conducted on RW-2 and RW-3 at the end of October in an effort to increase water production from the wells and bring the two recovery wells into service. Following well rehabilitation, RW-2 showed an average withdrawal rate of approximately 4 gpm in November 1988. However in December 1988, the water level in the well showed a steady decline and ultimately dropped to the pump intake level in mid-December. The submersible pump in RW-2 was subsequently damaged and the well was shut-down on December 22. A replacement pump is being ordered for RW-2.

During the well rehabilitation on RW-3, sand was found at the base of the well prior to commencing work. This sediment appeared to be part of the sand pack that was emplaced around the well screen and casing during the original installation of the recovery well. Additional sediment influx into the well was encountered during the rehabilitation of RW-3. The sediment influx indicates the failure of the well screen or casing at RW-3.

Ground water level data collected at the recovery and monitoring wells on 15 December 1988 were used to construct a water level contour map presented in Figure 1. This map represents actual water levels observed while the recovery wells RW-1, RW-2 and RW-4 were pumping. A complete summary of these water level data is presented in Table 2. The December 1988 contour map is similar to last quarter's water table contour map.

Monthly concentrations of organics recovered at RW-1, RW-2 and RW-4 are presented in Table 3. This data indicates that total organic concentrations recovered at the pumping wells are generally lower than contaminant concentrations reported from last quarter. For this quarter, the average monthly concentration of total benzene species at the recovery wells ranged between 34 and 226 ppm compared to 47 to 235 ppm for last quarter. In addition, a comparison of the December 1988 isoconcentration map of the total benzene species (Figure 2) with the September 1988 analytical data indicated the overall decline in the ground water contaminant concentrations. The 2 December 1988 analytical results are summarized in Table 4. A total of 14 wells sampled on 2 December 1988 showed a decline in the total benzene species concentrations from less than 1 ppm to over 100 ppm when compared to the 15 September 1988 analytical results.

MODIFICATIONS TO RECOVERY WELL RW-3

An evaluation was conducted to address the well screen/casing failure at recovery well RW-3, and to determine the most effective actions that would be required to reactivate RW-3. Based on the evaluation of RW-3, the following action items will be implemented at recovery well RW-3.

1. Replacement well screen and casing will be installed inside of the existing 8-inch diameter well. The new well components will consist of the following:

   - Screen - monel, 6-inch diameter, 10-feet long, continuous wire wound, 0.020-inch slot.
   - Riser Casing - 6-inch diameter, carbon steel.

   It is expected that the monel screen will be more resistant to the corrosive ground water conditions at the site. The well screen delivery is anticipated to take approximately 12 weeks.

2. The installation of a temporary pumping system in RW-3 as an interim measure prior to well screen/casing replacement should be considered.

RECOMMENDATIONS

1. The well screen and casing at RW-3 should be replaced as previously mentioned. In the interim, a temporary pump installed in RW-3 should be considered.

2. Recovery well RW-2 should be routinely rehabilitated to maintain adequate pumping rates.

3. Water level drawdowns in the recovery wells should be maximized to enhance the hydrogeologic barrier to contaminant migration. Control devices could be installed at the recovery wells to maximize available drawdowns without damaging the submersible pumps.

4. The feasibility of installing a submersible pump in well TW-6A and pumping the extracted water to the air stripper should continued to be investigated. It is expected that attempts to repair the bent casing at TW-6A will be accomplished in the next quarter. If repairs cannot be made to TW-6A, adjacent monitor wells should be evaluated to determine the feasibility of using one of the existing monitor wells as a recovery well.

WESTON

TABLE 1

AVERAGE MONTHLY WITHDRAWL RATES (GPM)
GROUNDWATER RECOVERY WELL SYSTEM

STANDARD CHLORINE OF DELAWARE, INC.

MONTH (1988)	RW-1	RW-2	RW-3	RW-4
October	4.84	PD = 31 days	PD = 31 days	4.8
November	4.70 PD = 7 days	3.98 PD = 15 days	PD = 30 days	5.7 PD = 7 days
December	5.79	4.6 PD = 9 days	PD = 31 days	5.87

PD - pump down

WESTON

TABLE 2

GROUNDWATER LEVEL DATA
STANDARD CHLORINE OF DELAWARE, INC.
15 DECEMBER 1988

Location	Measuring Point Elevation (Ft. MSL)	Depth to Water (Ft.)	Groundwater Elevation (Ft. MSL)
TW-1	49.90	30.34	19.56
TW-2	56.10	39.08	17.02
TW-3	56.30	39.67	16.63
TW-4	55.00	39.50	15.50
TW-5	50.10	33.58	16.52
TW-6	50.70	34.58	16.12
TW-7	50.40	34.50	15.90
TW-8	52.20	37.25	14.95
TW-10	50.50	37.00	13.50
TW-22	51.62	37.50	14.12
TW-24	49.44	37.92	11.52
TW-25	49.44	35.83	13.61
TW-28	52.82	41.08	11.74
TW-30	52.29	39.25	13.04
TW-31	50.36	36.25	14.11
TW-49	55.71	46.83	8.88
TW-50	53.28	45.16	8.12
TW-60	46.44	36.75	9.69
TW-61	45.50	36.58	8.92
TW-62	48.92	40.08	8.84
TW-63	53.83	44.92	8.92
TW-64	53.48	42.67	10.81
RW-1	54.75	47.08	7.67
RW-2	52.99	61.91	-8.92
RW-3	45.55	36.25	9.30
RW-4	48.08	39.67	8.41

WESTON

TABLE 3

MONTHLY CONCENTRATIONS OF TOTAL BENZENE SPECIES (ppm)
GROUNDWATER RECOVERY WELLS

STANDARD CHLORINE OF DELAWARE, INC.

MONTH (1988)	RW-1	RW-2	RW-3	RW-4
October	34.59	191.66	*	42.02
November	56.60	*	*	55.18
December	46.61	225.55	*	54.13

* No samples collected - Pump Inoperable during sampling events.

TABLE 4

QUARTERLY SAMPLING RESULTS
MONITOR AND RECOVERY WELLS

STANDARD CHLORINE OF DELAWARE, INC.

2 DECEMBER 1988

Location	Total Benzene Species Concentrations (PPm)
TW-1	5.20
TW-2	.06
TW-3	.09
TW-4	.08
TW-5	181.68
TW-6A	60.57
TW-7	23.67
TW-8	133.43
TW-10	95.88
TW-22	7.91
TW-24	85.97
TW-25	81.64
TW-28	*
TW-30	*
TW-31	184.32
TW-49	216.11
TW-50	203.56
RW-1	46.97
RW-2	242.91
RW-3	**
RW-4	55.35

* TW-30 and TW-28 have free organics.

** No samples collected - pump inoperable

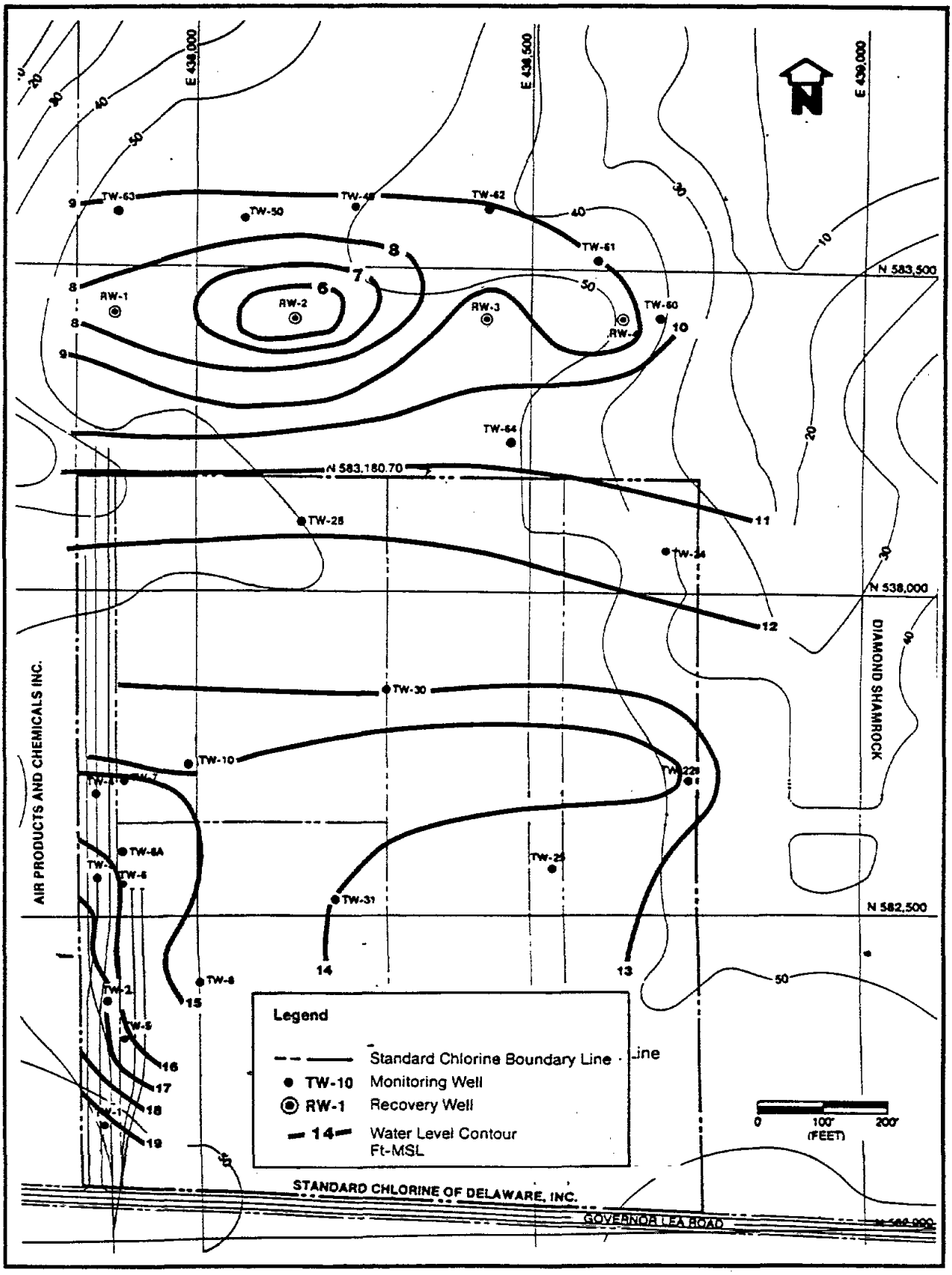

FIGURE 1 WATER LEVEL CONTOUR MAP
15 DECEMBER 1988

AR307745

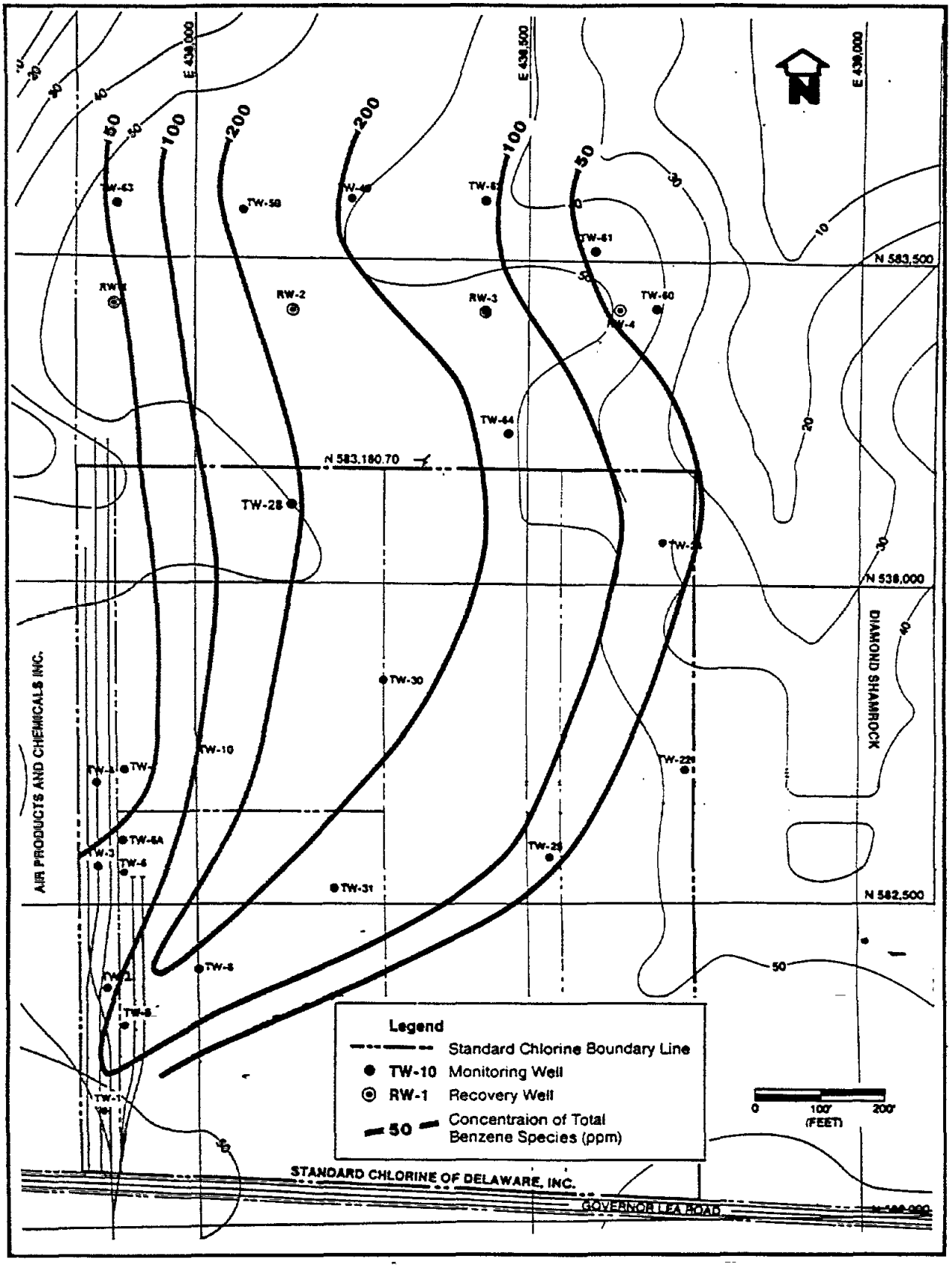

FIGURE 2 ISOCONCENTRATION MAP OF TOTAL BENZENE SPECIES 2 DECEMBER 1988

AR307746